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WORKING CAPITAL AND EFFECT ON FINANCIAL PERFORMANCE OF THE ENERGY SECTOR

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ABSTRACT

Background: Energy transition is a new threat to the energy sector, which contributes greatly to the Indonesian economy through state revenues, employment absorption, and foreign exchange. In making the energy transition, business diversification, or when exploring different areas, the company will issue capital expenditure and calculate its financial capacity to arrange financing.
Purpose: This study analyzes the impact of working capital on company performance in the energy sector and determines the effects of EPU) and COVID-19.
Design/methodology/approach: This study used data from the financial reports of energy sector companies on the company's official website from 2018 to 2022. The research sample was selected based on purposive sampling techniques using a nonprobability sampling method. Regression analysis was used to determine the effect of working capital on company value with EPU and COVID-19 as moderating variables using E-Views 12 software.
Findings/Result: The results indicate that there is a significant relationship between working capital and financial performance in the energy sector. Furthermore, the Economy Policy Uncertainty (EPU) ratio does not have a significant effect of working capital variables on the long-term profitability of energy sector companies in Indonesia. COVID-19 is also said to moderate the effect of working capital variables through NWC on the short-term (ROA) of energy sector companies in Indonesia.
Conclusions: The working capital has a significant influence on the short- and long-term profitability of companies, including the net working capital (NWC) and cash conversion cycle (CCC).
Originality/value (state of the art): Financial managers must understand the internal and external factors that influence working capital management to ensure sufficient working capital levels for a company to remain resilient and competitive(Haron & Nomran, 2016). This study also examines how Economic Policy Uncertainty influences the relationship between working capital management strategies and company value.

Keywords: Working Capital, Net Working Capital (NWC), Cash Conversion Cycle (CCC), Return on Assets (ROA), TOBIN'S Q, Economy Policy Uncertainty (EPU), COVID-19

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INTRODUCTION

Working capital refers to funds invested in a company's operational activities. In other words, working capital is a fund that utilizes the company's fixed investment or fixed assets to smoothly run business activities. Inadequate working capital causes obstacles to the smooth operation of operational activities. Ultimately, the cessation of operational activities leads to a decrease in business profit for a given period. Thus, an optimal amount of working capital is required to increase profit and profitability (Shaik et al. 2023).

Efficient working capital management is key to corporate strategy. The main objective of working capital management is to minimize risk and ensure smooth business operations, ensuring that the business can meet its short-term obligations. Many studies have shown that companies can lose valuable investment opportunities or experience liquidity problems if they do not properly manage their working capital. (Masinde dan Ochieng 2017; Khalaf et al. 2023).

The energy sector is an outlier, with significant fluctuations since 2021, which may be influenced by regulatory changes related to the transition from coal to renewable energy. In making the energy transition, business diversification, or when exploring different areas, the company will issue capital expenditure and calculate its financial capacity to arrange financing. Net working capital in the mining sector is negative from 2018, indicating a high risk of liquidation if the company does not manage its finances well.

According to TheAccountant Online (2025), energy sector companies rely on commodity market volatility, which has a direct impact on daily revenues and expenses. Having a robust working capital strategy helps protect against price volatility, while maintaining liquidity during downturns. In addition, the energy sector has been an important driver of industrial growth over the past century, providing fuel to power the Indonesian economy(Nindi Hastuti Damo et al. 2025). The energy sector contributes significantly to the Indonesian economy through state revenues, labor absorption, and foreign exchange. According to data from the Ministry of Energy and Mineral Resources (ESDM), Non-Tax State Revenue (PNBP) from the ESDM sector in 2022 reached IDR351 trillion or 138% of the target of IDR254 trillion. PNBP from the energy and mineral resources (ESDM) sector in 2023 reached IDR300.3 trillion, exceeding the target set at IDR259.2 trillion.

In addition to working capital management, another important strategy for a company is how its attitude responds to uncertainty(Köseoglu et al. 2013). When uncertainty occurs, the company's performance may decrease because of the high risk. Uncertainty occurs from operational, regulatory, and financial perspectives, which (Gulen and Ion 2016) suggests that corporate investment decreases when economic policy uncertainty (EPU) increases in the market. Companies with volatile cash flows and cash holdings that are insufficient for operations are very vulnerable in the short term; therefore, companies will focus on the cash conversion cycle (CCC) to remove cash from their working capital in the face of sudden liquidity pressures(Banerjee et al. 2021; Fernández-López et al. 2020).

Based on the data presented, for sustainable company performance, selecting the right working capital is crucial for optimizing operational costs and maintaining company liquidity(Tarighi et al. 2024). Energy companies face opportunities to diversify their businesses, along with threats in the form of strategic choices, in the face of energy transition. Therefore, financial managers must understand the internal and external factors that influence working capital management to ensure sufficient working capital levels for a company to remain resilient and competitive (Haron & Nomran, 2016). This study also examines how Economic Policy Uncertainty influences the relationship between working capital management strategies and company value. According toKoroma & Bein (2024), when uncertainty is high, companies may hesitate to invest in or develop new products, which can lead to reduced working capital and profitability. Companies that can effectively manage their working capital in the face of uncertainty may be better positioned to maintain long-term performance.

Many studies have examined the effect of working capital on company performance; however, only a few have examined the energy sector. Masinde & Ochieng (2017) examined five energy companies listed on the Nairobi Stock Exchange, showing that CCC has a negative effect on company performance, as measured by ROA. However, according to the results of Atac and Tas (2018), the examined 6 energy sector companies listed on the Turkish Stock Exchange, this negative

relationship occurs when the economy is good, and the relationship reverses when there is a shock to the economy. In Indonesia, research Nindi Hastuti Damo et al. (2025) shows that working capital turnover has no effect on ROA in energy companies listed on the Indonesia Stock Exchange. This study was conducted because the results obtained by previous researchers were different.

This study analyzes the effect of working capital using Net Working Capital (NWC) and the cash conversion cycle (CCC) on firm value, and then examines the impact of government regulatory risk (EPU) and the impact of COVID-19 on energy companies listed on the Indonesia Stock Exchange.

METHODS

The data used in this study were secondary data obtained from the financial statements of energy sector companies on the company's official website from 2018 to 2022. For the EPU variable, this study used data from the FRED St. Louis website using Indonesia's World Uncertainty Index (WUI) from 2018 to 2022 and dummy variables for COVID-19.

The research sample was selected based on a purposive sampling technique, with a non-probability sampling method, where the sample was selected based on certain criteria (i.e., companies that were not suspended in the research year have total assets that differ from those of other businesses and outlier companies)(Table 1).

Table 1. List of firms for this research

Company Code	Firm Name	Sub-industry
BIPI	Astrindo Nusantara Infrastruktur Tbk	Oil & Gas Production & Refinery
ENRG	Energi Mega Persada	Oil & Gas Production & Refinery
MEDC	Medco Energi International	Oil & Gas Production & Refinery
AKRA	AKR Corporindo Tbk.	Oil & Gas Storage & Distribution
HITS	Humpuss Intermoda Transportasi	Oil & Gas Storage & Distribution
INPS	Indah Prakasa Sentosa	Oil & Gas Storage & Distribution
PGAS	Perusahaan Gas	Oil & Gas Storage & Distribution
RAJA	Rukun Raharja Tbk.	Oil & Gas Storage & Distribution
SHIP	Sillo Maritime Perdana	Oil & Gas Storage & Distribution
SOCI	Soechi Lines Tbk.	Oil & Gas Storage & Distribution
ARII	Atlas Resources Tbk.	Coal Production
BOSS	Borneo Olah Sarana Sukses	Coal Production
BUMI	Bumi Resources Tbk.	Coal Production
DSSA	Dian Swastatika Sentosa	Coal Production
GTBO	Garda Tujuh Buana	Coal Production
HRUM	Harum Energy Tbk.	Coal Production
INDY	Indika Energy Tbk.	Coal Production
ITMG	Indo Tambangraya Megah	Coal Production
KKGI	Resource Alam Indonesia	Coal Production
PTBA	Bukit Asam Tbk.	Coal Production
SMMT	Golden Eagle Energy	Coal Production
TOBA	TBS Energi Utama	Coal Production
BBRM	Pelayaran Nasional Bina Buana Raya	Coal Distribution
DWGL	Dwi Guna Laksana	Coal Distribution
MBSS	Mitrabahtera Segara Sejati	Coal Distribution
PSSI	Pelita Samudera Shipping	Coal Distribution
TPMA	Trans Power Marine	Coal Distribution
ELSA	Elnusa Tbk.	Oil & Gas Drilling Service
DEWA	Darma Henwa Tbk	Oil. Gas & Coal Equipment & Service

Table 1. List of firms for this research (continue)

Company Code	Firm Name	Sub-industry
DOID	Delta Dunia Makmur Tbk.	Oil. Gas & Coal Equipment & Service
MYOH	Samindo Resources Tbk.	Oil. Gas & Coal Equipment & Service
PTRO	Petrosea Tbk.	Oil. Gas & Coal Equipment & Service
RUIS	Radiant Utama Interinsco Tbk.	Oil. Gas & Coal Equipment & Service
TAMU	Pelayaran Tamarin Samudra Tbk.	Oil. Gas & Coal Equipment & Service
WINS	Wintermar Offshore Marine Tbk.	Oil. Gas & Coal Equipment & Service

Panel data regression analysis was used to address the research objectives. The stages of panel data regression begin with model determination, model fit testing, classical assumptions, and hypothesis testing with e-views. The research model used to examine the relationship between working capital strategy and firm value is the regression model used to quote Ahmad et al. (2022),Tarighi et al. (2024), and Koroma and Bein (2024) are as follows:

Working Capital on Company Performance:

$ROA_{i.t} = \alpha + \beta_0 ROA_{t-1} + \beta_1 NWC_{i.t} + \beta_2 CCC_{i.t} + \beta_3 FS_{i.t} + \beta_4 GR_{i.t} + \beta_5 LEV_{i.t} + e_{i.t}$...**Model 1**

Working Capital on Company Performance with moderating variable EPU:

$ROA_{i.t} = \alpha + \beta_0 ROA_{t-1} + \beta_1 NWC_{i.t} + \beta_2 CCC_{i.t} + \beta_3 NWC*EPU_{i.t} + \beta_4 FS_{i.t} + \beta_5 GR_{i.t} + \beta_6 LEV_{i.t} + e_{i.t}$ ... **Model 2a**

$ROA_{i.t} = \alpha + \beta_0 ROA_{t-1} + \beta_1 NWC_{i.t} + \beta_2 CCC_{i.t} + \beta_3 CCCC*EPU_{i.t} + \beta_4 FS_{i.t} + \beta_5 GR_{i.t} + \beta_6 LEV_{i.t} + e_{i.t}$ … **Model 2b**

Working Capital on Company Performance with moderating variable COVID-19:

$ROA_{i.t} = \alpha + \beta_0 ROA_{t-1} + \beta_1 NWC_{i.t} + \beta_2 CCC_{i.t} + \beta_3 NWC*COV_{i.t} + \beta_4 FS_{i.t} + \beta_5 GR_{i.t} + \beta_6 LEV_{i.t} + e_{i.t}$ ….. **Model 3a**

$ROA_{i.t} = \alpha + \beta_0 ROA_{t-1} + \beta_1 NWC_{i.t} + \beta_2 CCC_{i.t} + \beta_3 CCC*COV_{i.t} + \beta_4 FS_{i.t} + \beta_5 GR_{i.t} + \beta_6 LEV_{i.t} + e_{i.t}$….. **Model 3b**

The dependent variable is financial performance using Return on Assets (ROA). The independent variables of the study consist of the influence of working capital using net working capital (NWC), the cash conversion cycle (CCC), and company-specific factors of working capital, namely company size (SIZE), sales growth (GROWTH), and leverage (LEV). This study also using Covid-19 (dC0V) and economic policy uncertainty (EPU) as moderating variables. Table 2 presents the definitions of each variable.

Working capital management in this study follows Ahmad et al. (2022), who use NWC and CCC as proxies to measure working capital. Net working capital (NWC) is the current assets minus the current liabilities on total assets. The NWC indicates whether a company's current assets are sufficient to cover current liabilities when converted into cash (Ahmad et al. 2022). A smaller NWC means a lower working capital investment, whereas a higher NWC indicates a higher working capital investment. A higher NWC can help improve a company's performance as it can drive sales. Cash conversion cycle (CCC) is a tool used to measure the average time it takes a company to collect cash after the sale of finished goods(Deloof, 2003). The optimal CCC is a short cycle so that the company can maximize its profitability and growth.

Changes in economic policy have the potential to alter the economic climate of a company's line of business. For example, monetary uncertainty about upcoming government policies is likely to affect a company's decisions (Kang et al. 2014). Businesses must stop operations during social restrictions and have a significant impact on the company's cash position. With the outbreak COVID-19 many businesses are facing supply- and demand-side disruptions that have halted the flow of goods and finances(Utit et al 2021). Therefore, firms with efficient working capital management are likely to be less affected and more resilient during difficult times such as during the COVID-19 pandemic(Seth et al. 2020).

Based on our study goals, there are three main hypotheses in this study, namely:

H1a: NWC has positive impact on firm performance

H1b: CCC has negative impact on firm performance

H2a: EPU moderates working capital management (NWC) on firm performance

H2b: EPU moderates working capital management (CCC) on firm performance

H3a: COVID-19 moderates working capital management (NWC) on firm performance

H3b: COVID-19 moderates working capital management (CCC) on firm performance

RESULTS

Based on Table 3, the average value of NWC was -1.33. with a minimum value of -270 and a maximum value of 20.5. CCC has a range of at least 2.1 days and a maximum of 20 days. Company performance (ROA) has a range of -31%, with the highest being 46%. Regarding company size (SIZE), looking at the total assets owned, the minimum value is 5.73, and the highest is 12.27. The company's sales growth (SG) has a minimum range of -7% and the highest is 249%. Debt ownership (LEV) had the lowest value (4%) and the highest (114%). From the description of the determinant variables, it can be observed that there are variations in each company.

The impact of working capital and other factors on financial performance

The statistical results of the regression using two-variable measurements for working capital as the independent variable can be used as a basis for drawing conclusions. The results are shown in Table 4, which displays the overall model results of this study. The results indicate that working capital, with the NWC proxy, is insignificant for company performance, with the ROA proxy, where each variable has a significance value below α=1%-5%. Meanwhile, the results show that working capital proxied by CCC, SIZE, GROWTH, and LEVERAGE has a positive and significant effect on ROA because these variables have a significance value of α=5%.

Table 2. Definition of the dependent, independent, and moderating variable

Variabel	Formula
ROA	ROA =(Net Profit)/(Total Asset)x100%
NWC	NWC=(Current assets-curremt liabilities)/(Total assets)
CCC	CCC = ACP + AAI – APP
	ACP = ((Account Receivable)/Sales) x 365
	AAI = ((Inventory)/(Cost of Good Sold)) x 365
	APP = ((Account Payable)/(Cost of Good Sold)) x 365
EPU	EPU Index
dCovid	Dummy Variable, 1 = Covid periode, 0= before Covid
SIZE	Total Assets
GROWTH	Growth=(Sales t_1 - Sales t_0)/(Sales t_0)
LEV	Lev=(total liabilities)/(total asset)

Table 3. Descriptive statistics of variables

Variable	N	Mean	St. Dev	Min	Max
NWC	35	-1.33587	1.55751	-270.213	20.52002
CCC	35	0.49727	0.19190	2.15E-06	20.65527
ROA	35	0.04241	0.00729	-0.31583	0.462062
SIZE	35	8.658063	0.116243	5.738156	12.27377
SG	35	0.263349	0.03841	-0.74456	2.492509
LEV	35	0.523826	0.018716	0.048031	1.149017

These results also align with previous research, such as that conducted by Ahmad et al. (2022) and Afza and Nazir (2008), who explain that CCC has a positive effect on ROA and Q. This explains why the longer a company's working capital cycle is, the better its performance, as reflected in its financial statements. This indicates that the company had many projects that required long-term working capital. According to JP Morgan, energy companies require a high level of working capital. The results of this study differ from those of Charitou et al. (2016) and Binti Mohamad and Mohd Saad (2010), who stated that the Cash Conversion Cycle (CCC) has a negative effect on short-term profitability (ROA) and long-term profitability (Q).

Based on the results in Table 4, EPU does not have a significant effect on moderating working capital, as measured by NWC and CCC on firm value as measured by ROA and Tobin's Q. In all four models, each variable had a significance value below α=1-10%. This is in line with research conducted by Pamestri and Wijayati (2024), who found Nurrahmi et al. (2023) that EPU has no moderating effect on the relationship between working capital and firm value. EPU is used to measure the risks that can arise from unpredictable policies. This is because Indonesia's economic stability and regulations are highly dependent on the central government, and policies can change depending on the priority of power holders. Therefore, companies, especially in the energy sector, implement alternative strategies to absorb the impact of policy changes by ending strategies in accordance with the impacts arising from a policy.

Based on The results in Table 4, it show that COVID-19 significantly impacts NWC, whereas SIZE, GROWTH, and LEVERAGE significantly impact ROA, with each variable having a significance value between α=1-5%. These results are consistent with those of previous research, such as that conducted by Ahmad et al. (2022) and Pant et al. (2024). The COVID-19 pandemic has negatively impacted corporate liquidity and profitability. Financial management must manage the working capital to ensure that sufficient resources are available to meet operational needs.

Mangerial Implications

Company

The results of this study indicate that the higher the cash turnover cycle, the higher is the company's performance. This result differs from the working capital management theory, namely that the shorter the cash cycle, the more efficient the company is in managing its operations. In the CCC variable, one part of the working capital cycle is the average collection rate (ACP) of sales to calculate the company's ability to collect its bills. Companies' sales in the energy sector are highly dependent on commodity prices.

Table 4. The result of stastic panel regression

Independent Variable	Model 1	Model 2a	Model 2b	Model 3a	Model 3b
	Coef.	Coef.	Coef.	Coef.	Coef.
NWC	6.140005	9.14E-05	6.30E-05	-9.26E-05	5.28E-05
CCC	0.027037***	0.011031**	0.032919**	0.002712	0.020716**
NWC*EPU		-0.010507			
CCC*EPU			-0.027029		
NWC*dCov				0.008247**	
CCC*dCov					0.004077
SIZE	0.036150*	0.018940***	0.036735***	0.018061***	0.035756*
GROWTH	0.057438***	0.063076***	0.056315***	0.063616***	0.058299***
LEV	-0.139576***	-0.152278***	-0.140505***	-0.145057***	-0.132220***
R-Squared	0.7019	0.389798	0.704439	0.402943	0.701864
F-Statistic	8.1506	17.88644	7.984359	18.89667	7.886496
Prob (F-Statistic)	0.0000	0.000000	0.000000	0.000000	0.000000
Model	FEM	REM	FEM	REM	FEM

***) sig at 0,01 (1%); **) sig at 0,05 (5%); *) sig at 0,1 (10%)

In 2022, when there was an energy crisis due to the Russian War with Ukraine, which caused the price of coal commodities to soar, it greatly affected the sales of coal companies in Indonesia. Of the 35 research objects, 24 companies were engaged in coal commodities, from Mining Business Permit (IUP) owners and contractors to shipping companies. Thus, when commodity prices increase, the theory of working capital management no longer applies to the energy sector. This phenomenon occurs not only for coal commodities, but also when oil prices rise, operational costs for mining will increase, so that many companies will postpone their operations if they are considered not comparable to the costs incurred. The performance of energy sector companies is highly dependent on commodity prices, which are influenced by demand, supply, international prices, and global market conditions. These results provide inputs for energy sector companies.

1) The difference in price assumptions used at the time of applying for debt (external financing) with the market price of coal reflected in the bills is very different, making it seem as if higher working capital significantly improves company performance.
2) Shortening the age of receivables on the term of payment (TOP) or reducing the value of receivables by withdrawing a larger down payment (DP) of approximately 20-30% when commodity prices rise. However, when commodity prices fall, the company can provide more receivables to new or existing customers to keep sales going.
3) Working capital remains important for the energy sector because, in mining activities that are carried out continuously, companies must maintain working capital to fulfill operational activities. This is because the operational activities of this sector differ from those of other sectors that naturally have seasonal production periods.

Investor

In addition, this study shows that working capital affects the performance of companies in the energy sector. Thus, investors can assess a company's performance by how the company manages the turnover of receivables, inventory, and debt payments, which will be taken into consideration in fundamental analysis when investors purchase shares.

Government

The results of this study can also provide input for the government for the regulation of Foreign Exchange Export Proceeds (DHE), in which exporting companies, including energy sector companies, store 100% of exports for 12 months or 1 year. However, when commodity prices fall, this period further disrupts company liquidity. To encourage energy transition through business diversification and investment, companies must spend capital on capital expenditure (CAPEX). Additionally, the operational activities of energy sector companies require adequate working capital to continue mining. Therefore, the government must provide policy leeway for regulation by shortening the period or reducing the percentage of stored figures.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the research results obtained, it can be concluded that working capital has a significant influence on the short- and long-term profitability of companies, including the net working capital (NWC) and cash conversion cycle (CCC). Furthermore, the macroeconomic ratio of economic policy uncertainty (EPU) does not moderate the influence of the working capital variables on the long-term performance of energy sector companies. EPU is used to measure the risks that can arise from unpredictable policies. This is because Indonesia's economic stability and regulation are highly dependent on the central government, and policies can change depending on the priorities of power holders. Therefore, companies, especially in the energy sector, implement alternative strategies to absorb the impact of policy changes by executing strategies that match the impact arising from a policy.

The results also show that COVID-19 moderates the effect of working capital variables along with NWC variables on energy sector companies in Indonesia. When a crisis occurs, companies must take the right steps in managing liquidity because it will have an impact on operations and further affect company performance. If a liquidity crisis occurs, the company will be efficient in operational activities that do not provide much added value.

Recommendations

The results of this study indicate that working capital positively affects the performance of energy sector companies. Therefore, to improve performance, companies can enter into long-term agreements with existing customers, differentiate themselves by exploring other commodities, and explore potentially captive markets. Although EPU (Economy Policy Uncertainty) does not impact company performance, companies must still monitor frequently changing government policies, such as royalty rates and ESG, as failure to comply with applicable regulations poses reputational risk. Furthermore, when a crisis such as COVID-19 affects company liquidity, companies should pay attention to commodity supply and demand as well as the impact these commodities have on their operations. Supply and demand significantly influences commodity prices.

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